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# ONR LONDON CONFERENCE REPORT

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## OFFICE OF NAVAL RESEARCH

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THE 2nd EUROPEAN CONFERENCE ON COMPUTER AIDED DESIGN  
IN SMALL- AND MEDIUM-SIZE INDUSTRIES

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29 March 1983

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20. ABSTRACT (Continue on reverse side if necessary and identify by block number) The conference emphasized applications of computer aided design in industries which have limited resources and are forced to innovate in order to compete. Specific topics included computer-aided design and manufacturing (CAD-CAM) user groups, mechanical engineering applications, CAD-CAM investment strategies, basic CAD techniques, CAD-CAM education and training, and applications in architecture and building design.		

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## THE 2nd EUROPEAN CONFERENCE ON COMPUTER AIDED DESIGN IN SMALL- AND MEDIUM-SIZE INDUSTRIES

The 2nd European Conference on Computer Aided Design (CAD) in small- and medium-size industries (MICAD 82) was held in Paris, France, 21 through 23 September 1982. The conference emphasized applications of CAD in industries which have limited investment resources and are forced to innovate in order to compete. Specific topics included CAD and computer aided manufacturing (CAM) investment strategies, basic CAD techniques, CAD-CAM user groups, mechanical engineering applications, CAD-CAM education and training, and applications in architecture and building design.

The conference was organized by the French Association (A.F.) MICADO (Mission for Computer Aided Design). MICADO was established in 1974 to help French industry adopt CAD techniques. The association is made up of over 120 French members, representing government, research centers, universities, service bureaus, industry, and future users of CAD.

The first MICAD conference, in September 1980, also was held in Paris; about one-half of the participants and two-thirds of the authors came from outside France. However, the 1982 conference had a much stronger French representation. MICAD 82 had 319 attendees from 16 countries; about 77% were from France. There were 12 sessions, including panel discussions. Two-thirds of the authors were from France; over 80% of the panel members were from France. All papers by French authors were presented in French with simultaneous English translation

provided. All other papers were given in English (with simultaneous French translation provided).

This report describes the conference, offers conclusions about it, and discusses its relationship to the CAD activities of the European Economic Community (EEC).

### The Sessions

The inaugural speech was given by C. Garrigues, Chairman of the French Agency of Information. Garrigues emphasized some of the targets for French industry for the next 4 years:

- Production increases of 9% per year
- Creation of 80,000 jobs by 1986
- Balance of French trade improved
- Modernization of production systems
- Social issues emphasized
- Scope of CAD enlarged.

Garrigues suggested that to incorporate CAD techniques successfully, small businesses must have both global and management plans. Several difficulties of introducing CAD in small- and medium-size companies were pointed out:

- High cost
- Short depreciation periods
- Data-base problems
- Lack of human skills
- Training problems.

Garrigues emphasized that a link must be established for the development and distribution of CAD tools. He said that priority should be given to developing tools appropriate for small companies. Stress, he said, should be placed on making educational institutions realize the importance of integrating CAD into their teaching. He also

noted however, that educational institutions must be modest but accurate and global in their approach to the introduction of CAD.

Three papers were presented in the first session:

- CAD productivity: fact or myth?

- Investment strategies for CAD-CAM

- Planning the introduction of CAD systems in small- and medium-size companies.

The first paper made some strong statements about the return on investment for CAD systems. The author stated that most firms are not prepared for the high costs of training operators, the long learning cycles, the disruptive impact on current operations, and the demands on management. Only through proper planning, training, organization, and management can a firm successfully install a CAD system and have it pay off. To be effective, the speaker said, a CAD system must be an extension of current skills and experience.

The second paper outlined where companies must focus their planning if they are to use CAD-CAM successfully. Six strategies--from walk-in centers to multiple linked systems--were described. For all systems, the need to consider the impact on the total organization was pointed out. Proper training at all levels was pinpointed as probably the most important single ingredient of success--even more significant than hardware and software selection.

The third paper was based on an analysis of the structure of the German mechanical industry. The data showed that small concerns (fewer than 500 employees) made up 92% of all companies; but only 23% were

using electronic data processing, compared with 63% of the large companies. The speaker said that small companies hesitate to use CAD because of the excessively high cost, the considerable effort in planning and introducing a CAD system, and the lack of CAD awareness in most of the companies.

Several alternatives for CAD options were presented, and an algorithmic-like procedure for conducting a feasibility study for CAD introduction was outlined. It was pointed out that because no risk is acceptable when CAD is introduced in a small- or medium-size company, only options that promise success should be selected.

To help small- and medium-size companies, in the past few years the Institute of Production Systems and Design Technology in Berlin (IPK) has held many seminars on CAD introduction. IPK's experience in assisting companies, coupled with intensive efforts of CAD producers to offer cheaper solutions, leads the institute to expect intensive use of CAD technology in small- and medium-size companies.

Seven sessions of the conference were rather typical of CAD meetings in that they dealt with specific applications, particular program developments, or experience in an area. Included were sessions on basic techniques; applications in mechanical engineering, electrical engineering, architecture, and building; and other CAD applications.

More general sessions concerned user's groups for CAD-CAM, and CAD-CAM education and training. In the session on user's groups, a paper was presented by J. Delvac of Sperry Corporation, and a discussion by 10 panelists followed. It was agreed that user groups

are valuable for users in small- and medium-size industries. Time spent participating in such groups is more than repaid through benefits to the company. It was pointed out that there are several user groups--e.g., within a company, and professional, union, or collective associations (MICAD)--and each can serve a different purpose.

The panel on CAD-CAM education and training was made up of representatives from industry and education. The group did not arrive at a consensus about what was required. Several of the panelists were uncertain about how educators should approach the teaching of CAD-CAM: what techniques will be used in the future; how should the idea of design and the use of computers be taught? In 1983 MICADO is sponsoring a national symposium to cover CAD-CAM training and technology; perhaps the issues will be better defined then.

Mr. Dieli Lechanteux, from France's Ministry of Research and Industry, gave the last presentation at the conference. His talk, "Government Policy for Developing CAD in France," was rather wide ranging but did emphasize that the French government intends to support CAD development, particularly for small- and medium-size companies.

The government recognizes that compared with the US and Japan, France is just starting to use CAD-CAM. France has training problems and a lack of CAD experts. In addition, businesses generally are not equipped for CAD. However, Lechanteux said that the government will make loans at 2% under rate for small- and medium-size companies to buy CAD equipment. He also said that the government has money allocated for supporting CAD development--"if a good case

comes up it will be financed."

Lechanteux stated that France is at the forefront in three-dimensional systems and modeling but currently is exporting few systems. One goal is for French firms, by 1986, to have a significant share of the US and Japanese market in CAD-CAM systems. France has a broad-based plan and is now studying 12 areas in which CAD can change the trade balance.

#### Summary

The conference seemed to have something of a dual personality: its principal aim was to promote and develop CAD in French industry; yet it tried to be international. The two objectives were sometimes at odds.

The European countries recognize that in many areas of high technology they trail the US and Japan. Computer aided design, they feel, is essential to securing an equal technological foothold in international markets.

The Council of the European Communities has taken some action to develop European CAD, as noted in Lawrence Livermore National Laboratory report UCID-18154 (December 1974). But several basic problems in Europe probably will inhibit the success of a cooperative effort in CAD. Of course, exchanging information between companies on a formal or informal basis can present problems. In addition, the nationalistic goals and pride of each of the various nations, together with language barriers, tend to emphasize the difficulty of pursuing common goals.

Nevertheless, the EEC in August 1982 released a proposal calling for up to \$1 billion of funding for research in information technologies. The Common Market countries are being asked

to approve five target areas: microelectronics, software technology, advanced information processing, office automation, and computer-integrated manufacturing. The 1983 EEC budget includes \$11.5 million to start research.

In a year it will be clearer whether the EEC effort has helped or hindered France's reorganization of the electronics industry. There is no doubt, though, that since the election of a Socialist government, France is making strong moves to change its position in electronics. The government has budgeted more than \$20 billion for the industry over the next 5 years (about a 30% increase over current spending).

Fourteen projects have been proposed and nine adopted: central processing units for

minicomputers and microcomputers, consumer electronics, display systems, local communications networks, cable TV networks, design and fabrication of very large scale integrated circuits, and computer aided design, fabrication, instruction, and translation. The projects overlap the EEC's areas of concern; if national interests can be put aside, in a few years there could be some significant changes in the European and the French balance of payments in electronics.

The conference proceedings should be available from:

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